DESTRUCTION-FREE PRESS CONNECTION ON PYROMECHANICAL SECURING ELEMENTS

Technical Field

[0001] The invention relates to a pyromechanical securing element according to the preamble of claim 1.

Background of the Invention

[0002] Such a pyromechanical securing element is known from German Offenlegungsschrift 10 338 394, (which corresponds with US 2006/0110233 A1 to Breed, et al.) which was published after the priority date of this application.

[0003] This securing element consists of a metallic covering, in the head part of which a pyrotechnic propellant charge is arranged. This propellant charge borders on an adapter. A flanged edge for securing a first component is arranged on the rear part of the covering, bordering on the adapter. A second component can be pushed onto the covering between this first component and the head part so that the second component rests on the first component.

[0004] At its head part, the covering has theoretical break notches running in longitudinal direction, which tear open when igniting the propellant charge, so that the surfaces lying inbetween bend around the adapter and thus press the second component either directly or via a floating disc against the first component, as a result of which the first component is firmly connected to the second component.

Summary of the Invention

[0005] The object of the invention is to improve a pyromechanical securing element according to the preamble of claim 1, so that the covering can be anchored by the adapter without extreme application of force.

[0006] This object is achieved according to the invention in that:

- in the adapter is arranged a groove rotating at least in sections on its outer periphery,
- in that before anchoring the covering with the adapter, a radially projecting collar is arranged on the outer surface of the covering,
- in that the groove in the adapter is aligned with the collar of the covering and
- in that at least one part of the collar is pressed into the groove to anchor the covering with the adapter.

[0007] Due to the arrangement of a groove in the adapter and the collar aligned therewith on the outer surface of the covering, when pressing at least a part of the collar into the groove, extreme application of force is not required to anchor the covering with the adapter.

[0008] In a preferred embodiment, the groove in the adapter and the collar of the covering are designed to be rotating on the particular outer periphery.

[0009] The outer surface of the covering has an at least 3-surface shape after pressing in according to the invention. The covering preferably has a square shape after pressing in. A square shape of the covering and hence of the securing element is particularly advantageous for installation.

[0010] The corners, for example of the square shape of the covering, are advantageously bevelled. This beveling is effected by pressing the covering into the groove at these points.

[0011] In one embodiment of the invention, the covering is produced from metal and the adapter is preferably designed to be cylindrical. The adapter is usually produced from metal, but may also consist of a strong plastic.

[0012] The groove in the adapter is advantageously arranged centrally with respect to its longitudinal extension.

[0013] The invention is illustrated in more detail below using an exemplary embodiment.

Brief Description of the Drawings

[0014] FIG. 1, is a cross-sectional view taken along the longitudinal axis of a securing element embodying the preferred embodiment of the present invention prior to affixation of the adapter to the covering;

[0015] FIG. 2, is a cross-sectional view corresponding to that of Figure 1 after fixation of the adapter to the covering; and

[0016] FIG. 3, is a cross-sectional view taken along lines 3 – 3 of Figure 2.

Description of the Preferred Embodiment of the Invention

[0017] Figure 1 shows in a longitudinal section, the covering 1 of a pyromechanical securing element in which an adapter 2. The adapter 2 is designed to be cylindrical in this embodiment and preferably consists of metal, like the covering 1. A

propellant charge 6, which can be ignited, for example by a laser beam, is arranged in the head part 5 of the covering 1.

[0018] So that the propellant charge 6 or the resulting gases, after ignition thereof, tear open the covering 1 in the region of the head part 5 and it may bend around the adapter 2, theoretical break notches running in longitudinal direction are provided in the head part 5. These theoretical break points run radially on the end-face side of the head part 5.

[0019] A cavity 7 for pressure build-up is arranged between the propellant charge 6 and the adapter 2. When an adapter 2 bordering on the propellant charge 6 is mentioned, this also includes the introduction of a cavity 7 between the latter.

[0020] An annular groove 3 is arranged on the outer periphery of the adapter 2. The covering 1 has a collar 4 rotating on its outer periphery flush with this groove 3.

[0021] Figure 1 shows the securing element before anchoring of the covering 1 with the adapter 2.

[0022] Figures 2 and 3 show the securing element after anchoring, with Figure 2 being in the same longitudinal section as Figure 1. It can be seen clearly that the collar 4 in the state before anchoring (Figure 1) has disappeared in the state after anchoring (Figure 2) on the outer periphery of the covering 1. The material of the collar 4 has been pressed radially in the direction of groove 3 by a pressing process and is now situated (at least partly) in this groove 3, as a result of which in addition to the very robust mechanical anchoring of the covering 1 with the adapter 2, a square key shape of the securing element having beveled corners 8 and flats 15 is produced.

[0023] Figure 3 illustrates the original outer peripheral surface of the collar 4 in phantom at 9.

[0024] The three Figures 1 - 3 do not show the securing means or a stop for a first component.